UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,314	08/14/2003	Noboru Fujita	59713(70904)	2860

7590 08/25/2004

Dike, Bronstein, Roberts & Cushman
Intellectual Property Practice Group
Edwards & Angell, LLP
P.O. Box 9169
Boston, MA 02209

EXAMINER	
THOMAS, BRANDI N	

ART UNIT	PAPER NUMBER
2873	

DATE MAILED: 08/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/642,314	FUJITA, NOBORU	
	Examiner	Art Unit	
	Brandi N Thomas	2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 August 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *8/14/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Detailed Action*.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. Acknowledgement is made of receipt of Information Disclosure Statement(s) (PTO-1449) filed 8/14/03. An initialed copy is attached to this Office Action.

Drawings

3. Figures 4, 5, 6a-6h, 7a-7c, and 8a-8f should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US 2002/0126390 A1).

Regarding claim 1, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, comprising the steps of: (1) disposing a stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) having a first micro-lens array pattern (not numbered, shown as the circular patterns between the reference numbers 17 and 18) formed on one surface of the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) and a second micro-lens array pattern (not numbered, shown as the circular patterns between the reference numbers 17 and 16) formed on other surface of the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) between a first transparent substrate (19) and a second transparent substrate (15) facing each other (figure 1) (sections 0059 and 0060); and (2) removing the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces), after forming a micro-lens array which is made of a first light transmitting resin (18) between the first transparent substrate (19) and the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) and forming a micro-lens array which is made of a second light transmitting resin (16) between the second transparent substrate (15) and the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces), so as to fix a third light transmitting resin (17) between the micro-lens arrays (not numbered, shown as the circular patterns between the reference numbers 17 and 18 and 17 and 16) (sections 0034, 0035, and 0062), the stamper

(shown as the space between 16 and 18, including circular patterns on both surfaces) being removed under a condition where the first transparent substrate (19) and the second transparent substrate (15) maintain a state in which they face each other (figure 1) except that it does not show that the movement of the second transparent substrate is restricted to a direction orthogonal to a substrate surface of the first transparent substrate, and movement of the first transparent substrate is restricted to a direction orthogonal to a substrate surface of the second transparent substrate. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to restrict the movement of the first and second substrates to an orthogonal direction for the purpose focusing and reflecting the incident beam from an optical source without any loss.

Regarding claim 2, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein the first transparent substrate (19), the second transparent substrate (15) and the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) are held so as to be parallel to one another (figures 1, 2A, and 2B).

Regarding claim 3, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein the micro-lens arrays (not numbered, shown as the circular patterns between the reference numbers 17 and 18 and 17 and 16) which are respectively made of the first light transmitting resin (18) and the second light transmitting resin (16) are formed in a state where the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) is set in place (figure 1) (section 0034, 0035, 0059, and 0060).

Regarding claim 4, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein there is a difference in refraction index between the first and

third light transmitting resins (18 and 17) after hardened and/or a difference in refraction index between the second and third light transmitting resins (16 and17) after hardened (sections 0021, 0079, and 0080) but does not specifically discloses the difference being not less than 0.1. However, it would have been obvious to modify the refraction index to not be less than 0.1, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a refraction index of the differences of the light transmitting resins not to be less than 0.1 for the purpose of combining interfaces between neighboring resin layers.

Regarding claim 5, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein a refraction index of the third light transmitting resin (17 and n_3) after hardened is higher than refraction indices of the first and second light transmitting resin (18,n_1 and 16,n_2) after hardened (section 0080, case, $n_1 < n_2 < n_3$, where n_1 is the first light transmitting resin, n_2 is the second light transmitting resin, n_3 is the third light transmitting resin).

Regarding claim 6, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein at least one of the first light transmitting resin (18) and the second light transmitting resin (16), and the third light transmitting resin (17) is ultraviolet-hardening resin (section 0034).

Regarding claim 7, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein the first light transmitting resin (18) and the second light transmitting resin (16) are made of the same material (sections 0034 and 0083).

Regarding claims 8, 9, and 15, Matsushita et al. discloses, in figure 1, a method according to claim further comprising: a resin supplying step of supplying the first light transmitting resin (18) between the first transparent substrate (19) and the surface on which the first micro-lens array pattern (not numbered, shown as the circular patterns between the reference numbers 17 and 18) is formed and supplying the second light transmitting resin (16) between the second transparent substrate (15) and the surface on which the second micro-lens array pattern (not numbered, shown as the circular patterns between the reference numbers 17 and 16) is formed; a contacting step of contacting the first transparent substrate (19) and the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) via the first light transmitting resin (18) and contacting the second transparent substrate (15) and the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) via the second light transmitting resin (16) (figure 1); a forming step of hardening the first light transmitting resin (18) and the second light transmitting resin (16) to form the respective micro-lens arrays (sectiOns 0059 and 0060); a separating step of separating the micro-lens arrays from the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces), a removing step of removing the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) from between the micro-lens arrays (sections 0034 and 0035); a third resin supplying step of supplying the third light transmitting resin (17) between the respective surfaces on which the two micro-lens arrays are formed; a substrate contacting step of contacting the two micro-lens arrays via the third light transmitting resin (17) (sections 0059-0062); and a third resin hardening step of hardening the third light transmitting resin (sections 0034 and 0035).

Regarding claim 10, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein the micro-lens arrays (not numbered, shown as the circular patterns between the reference numbers 17 and 18 and 17 and 16) which are respectively made of the first light transmitting resin (18) and the second light transmitting resin (16) are formed in a state where the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) is set in place (figure 1) (section 0034, 0035, 0059, and 0060).

Regarding claim 11, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein there is a difference in refraction index between the first and third light transmitting resins (18 and 17) after hardened and/or a difference in refraction index between the second and third light transmitting resins (16 and17) after hardened (sections 0021, 0079, and 0080) but does not specifically discloses the difference being not less than 0.1. However, it would have been obvious to modify the refraction index to not be less than 0.1, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)). It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a refraction index of the differences of the light transmitting resins not to be less than 0.1 for the purpose of combining interfaces between neighboring resin layers.

Regarding claim 12, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein a refraction index of the third light transmitting resin (17 and n_3) after hardened is higher than refraction indices of the first and second light transmitting resin (18,n_1 and 16,n_2) after hardened (section 0080, case, $n_1 < n_2 < n_3$, where n_1 is the first light transmitting resin, n_2 is the second light transmitting resin, n_3 is the third light transmitting resin).

Regarding claim 13, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein the first light transmitting resin (18) and the second light transmitting resin (16) are made of the same material (sections 0034 and 0083).

Regarding claim 14, Matsushita et al. discloses, in figure 1, a method for manufacturing a micro-lens array substrate, wherein at least one of the first light transmitting resin (18) and the second light transmitting resin (16), and the third light transmitting resin (17) is ultraviolet-hardening resin (section 0034).

6. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushita et al. (US 2002/0126390 A1) in view of Arakawa et al. (US 2003/0091781 A1).

Regarding claim 16, Matsushita et al. discloses, in figure 1, an apparatus for manufacturing a micro-lens array substrate, in which micro-lens arrays which are respectively made of a first light transmitting resin (18) and a second light transmitting resin (16) are formed respectively on a first transparent substrate (19) and a second transparent substrate (15), and a third light transmitting resin (17) is fixed between the micro-lens arrays to manufacture a micro-lens array substrate, the apparatus comprising: first and second transparent substrates (19 and 15) so that they face each other (figure 1) (sections 0059 and 0060); a stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) between the first transparent substrate (19) and the second transparent substrate (15); removing the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces); the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) having a first micro-lens array pattern (not numbered, shown as the circular patterns between the reference numbers

17 and 18) formed on one surface of the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) and a second micro-lens array pattern (not numbered, shown as the circular patterns between the reference numbers 17 and 16) formed on other surface of the stamper (shown as the space between 16 and 18, including circular patterns on both surfaces) except that it does not show a first holder and a second holder for holding the first and second transparent substrates, a stamper holder for holding a stamper, and a restricting member for restricting movements of the first holder, the second holder, and the stamper holder. Arakawa et al. shows, in figure 20, that it is known to provide a first holder (101) and a second holder (116) for holding the first and second transparent substrates (102 and 115), a stamper holder (106 and 111) for holding a stamper (109 and 110), and a restricting member (105) for restricting movements of the first holder (101), the second holder (116), and the stamper holder (106 and 111) for correcting parallelism and to make a pressing force uniform between the first and second holder (sections 0054 and 0055). Therefore it would have been obvious to someone of ordinary skill in the art at the time the invention was made to combine the teaching of Matsushita et al. with the first and second holders, stamp holder, and the restricting member of Arakawa et al. for the purpose of correcting parallelism and to make a pressing force uniform between the first and second holder (sections 0054 and 0055).

Regarding claim 17, Arakawa et al. discloses, in figure 20, an apparatus for manufacturing a micro-lens array substrate, wherein the stamper holder (106 and 111) is fixed to the restriction member (105) (figure 20).

Regarding claim 18, Arakawa et al. discloses, in figure 20, an apparatus for manufacturing a micro-lens array substrate, wherein the stamper holder (106 and 111) holds the

stamper (109 and 110) so that the stamper (109 and 110) can pivot upon a direction vertical to the substrate surface of the first transparent substrate (102) (sections 0054 and 0055).

Regarding claim 19, Arakawa et al. discloses, in figure 20, an apparatus for manufacturing a micro-lens array substrate, wherein the stamper holder (106 and 111) fixes one end of the stamper (109 and 110) and holds other end of the stamper (109 and 110) removably (figure 20).

Regarding claim 20, Arakawa et al. discloses, in figure 20, an apparatus for manufacturing a micro-lens array substrate, including a stamper (109 and 110) but does not specifically discloses the stamper having a thickness of lmm to 2Omm. It is obvious to modify the stamper to include a thickness of 1mm to 20mm, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (In re Aller, 105 USPQ 233). It would have been obvious to someone of ordinary skill in the art at the time the invention was made to modify the stamper to include a thickness of 1mm to 20mm for the purpose of easily removing the stamper from the apparatus after forming the micro-lens array.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yamanaka et al. (US 2004/0012734 A1) discloses a method of producing a micro-lens array excellent in surface accuracy and flatness while eliminating the need of provision of a cover glass (glass substrate).

Freese et al. (US 2004/0008411 A1) discloses a light-transmission screen includes a diffusing element formed a micro-lens array for projecting images in a viewing space.

Mizuguchi et al. (5543942) discloses an opposed substrate for use in a liquid crystal display element.

Aoyama et al. (5536455) discloses a first array of first lens-base elements formed on a substrate with spacing therebetween.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brandi N Thomas whose telephone number is 571-272-2341. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BNT

BNT
August 12, 2004

Georgia Epps
Supervisory Patent Examiner
Technology Center 2800